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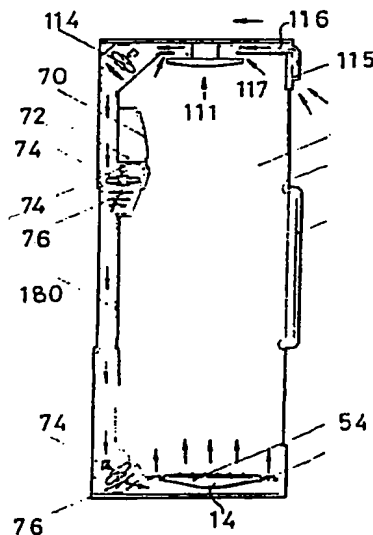
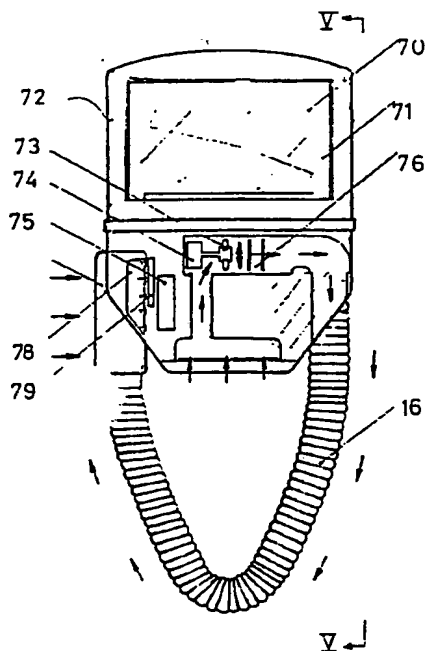
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(71) Applicant (for all designated States except US): **GEE, David, William [GB/GB]; Farmhouse Court, Marston, Sutton Coldfield, West Midlands B76 0DW (GB).**

(71)(72) Applicant and Inventor: **LANE, John [IE/GB]; 3 Hal-loughton Road, Four Oaks, Sutton Coldfield, West Midlands B74 2QG (GB).**

(74) Common Representative: **GEE, David, William; Farmhouse Court, Marston, Sutton Coldfield, West Midlands B76 0DW (GB).**

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Published*With international search report.**Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.*(54) Title: **HOT AIR BODY DRIER**

(57) Abstract

A hot air body drier which includes an air inlet (22), a hot air blower (73), air heating means (76) and a hot air outlet (14), characterised in that the hot air blower is connected to the hot air outlet by a hollow conduit (16, 80) having a length greater than its width.

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HOT AIR BODY DRIER

This invention relates to a hot air body drier.

It is known to use towelling fabrics for body drying; such towelling fabrics are conventionally formed into "towels" of suitable size and shape, and as such are widely available articles of commerce. Towels can be washed, dried and re-used. There are however disadvantages in the use of towels for body drying, and these have long been recognised. Whether in a public facility or at home, the available towels may have been used by other persons, and so may be unhygienic and/or too damp for effective drying. The (dry) replacement towels may be out of convenient reach, in another room. Many people have difficulty in using a towel properly to dry their back, or their legs, particularly in a confined space such as a shower cubicle, and this is especially so for the less dexterous such as children and the elderly, and invalids.

Other water absorbents have also been proposed, particularly for hand drying, one being paper sheets. Such paper sheets are intended to be used only once before being discarded, and so are believed more hygienic than the multi-use towelling. However these sheets have the other disadvantages of the fabric towelling mentioned above, with the additional drawback that many people dislike the feel of paper sheets of the required wet-strength, particularly on the more sensitive parts of their skin; storage

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of the wet paper sheets until disposal, and their subsequent disposal, can both create problems.

Hot air "skin" drying is already known, but so far as I am aware the known units have been conceived as suitable only for
5 hand drying, from a "hot air" outlet fixed in position; the outlet is directly connected to a hot air blower without an intervening air conduit. Such a hot air "hand" drier is not convenient or suitable for (over-all) body drying.

Hot air "hair" dryers are also known, but in general these are
10 not suitable for body drying since the unit to be manipulated includes the electric motor and the fan or blower; a hair dryer has to be of low duty (small fan size, and low hot air volume and velocity) if it is not to be too heavy and cumbersome, but even
15 then such dryers are often too difficult for the young and the elderly, and invalids and the handicapped, to manipulate safely. Since hair dryers are conventionally powered by electricity at mains voltage, their use in a bathing area can be dangerous.

Thus according to my invention I provide a hot air body drier which includes an air inlet, an air blower, air heating means and
20 a hot air outlet, characterised in that the hot air blower is connected to the hot air outlet by a hollow conduit, the conduit having a length greater than its width. Thus for a conduit which is circular in cross-section, its length is greater than its diameter; for a conduit which is acircular e.g. rectangular, in

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cross-section, the length of the conduit is greater than its maximum cross-sectional dimension. The length of the conduit is measured in the direction of axial hot air flow, whilst the width is measured perpendicular thereto.

- 5 The conduit may have rigid ends and an intermediate flexible section, the flexible section being of a length several times its mean diameter, the rigid ends being used to connect the conduit respectively to an air heating chamber and/or to an air blower chamber, and to the hot air outlet.
- 10 Preferably the hot air outlet is shaped to receive one of a number of alternative outlet connections or accessories, whereby the air can selectively for example be channeled into a narrow fan shape, or into a plurality of separate air streams. Usefully the accessories can be both fitted and replaced by the user.
- 15 The conduit if flexible is usefully of a length so that the hot air outlet can be manipulated and directed towards any portion of the body. The conduit if fixed, as to a wall, can usefully be apertured to provide a number of hot air nozzles or equivalent along its length, for full-length body drying, though a single
20 nozzle, preferably adjustable in direction, could alternatively be used.

The hot air outlet can be located in a cubicle; if however the hot air body drier is to be used in conjunction with a shower or

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other water-spray cubicle, preferably at least the the hot air blower and air heating means are outside the cubicle.

Conveniently the hot air blower can be controlled to heat the incoming air to a selected temperature, from an available range
5 of temperatures, and may include a fan adapted to move the air at a flow rate selected from number of available flow rates.

The invention will be further described by way of example with reference to the accompanying schematic drawings in which:-

Fig.1 is a part-view in side elevation of one embodiment
10 of hot air body drier according to the invention;

Fig.2 is a front view of the drier of Fig.1;

Fig.3 is a side view of apparatus according to the invention, in use;

Fig.4 is a front view of an alternative embodiment;

15 Fig.5 is a view on the line V-V of Fig.4;

Fig.6 is a side view of an alternative embodiment of the invention, in use;

Fig.7 is a side view of a further embodiment of the invention;

Fig.8 is a view on the line VIII-VIII of Fig.7;

20 Fig.9 is a perspective view of a further embodiment;

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Fig.10 is a side view of a cabinet incorporating the invention;
and

Fig.11 a sectional view of the cabinet of Fig.10.

In the drawings, parts performing a similar function carry the
5 same number.

The hot air body drier 10 includes a hot air blower 12, a hot
air outlet 14, and a flexible conduit 16 connecting the hot air
blower 12 and hot air outlet 14. As seen more particularly in
Fig.2, conduit 16 has an intermediate section 17 which is
10 flexible and of a length several times its width, and has end
sections 18,19 which are more rigid than the remainder of the
conduit for connection respectively to the blower air exit 22 and
to hot air outlet 14.

Hot air blower housing 12 has a cool air inlet 20 (Fig.2),
15 which in this embodiment is removable to permit replacement of a
dust filter. Internally of blower housing 12 there is a fan (not
shown) adapted both to draw in air through inlet 20 and to expel
the air through exit 22, and thus through flexible conduit 16
since conduit 16 is connected to exit 22. Also within blower
20 housing 12 is air heating means; in this embodiment the air
heating means comprises electrically heatable wires (not shown)
positioned to face the exit side of the fan, so that the fan
blows the cool air drawn in from inlet 20 over the hot wires.

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Control panel 24 includes rocker switches 26, 28; though in alternative embodiment these switches can be sliding switches. In its normal (intermediate) position as shown, switch 26 disconnects the internal fan, but if its upper edge (as seen in
5 Fig.2) is pressed into the paper, the fan is energised to rotate at half speed; whilst if its lower edge is pressed into the paper the fan is energised to run at full speed. Similarly, if switch 28 is in the (intermediate) position shown, the heating wires are not connected to the electrical current, but if its upper edge is
10 pressed into the paper the wires are energised at half amperage, whilst if its lower edge is pressed into the paper the wires are energised at full designed amperage. Switch 28 is inoperative unless switch 26 is in an energising condition.

Blower 12 is connected to a wall 30 by screws or equivalent,
15 through screw holes 32; a primary support member 34 for flexible conduit 16 and thus hot air outlet 14 is also connected to wall 30, in the embodiment shown at a position above blower 12; in an alternative embodiment the primary support member 34 is mounted on a different wall or surface to blower 12.

20 The end 36 of primary support member 34 remote from wall 30 includes a pivot 38 to which is coupled secondary support member 40; pivot 38 is tightenable to lock secondary support member 40 at a selected angle relative to primary support member 34. Secondary support member 40 is of known design, permitting the

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flexible conduit 16 to be fitted therein, and removably retained.

A particular use for this embodiment of the invention is by mothers seeking properly to dry babies, whose skin may be or
5 become irritated by nappy rash or the like, so that rubbing or further rubbing with a towel causes discomfort and possibly pain. The use of flexible conduit 16 permits the drying to be effected with the baby firmly and safely held; whilst the length of conduit can be selected both for this application and so that
10 the hot air blower is well away from any water e.g. out of line of or out of range of, the water spray from a shower end; so that even if a child (or unstable adult) knocks over a shower spray or otherwise sprays or splashes about the bath or shower water, the electrically-connected blower does not become wetted.

15 Fig.3 is of a hot air body drier 10 in use. The wall mounted unit 50 includes the hot air blower housing 12, from which extends the flexible conduit 16. The hot air outlet 14 is held in one hand, whilst the user 2 is steadying himself with the other hand by means of handle 52. As shown, user 2 is standing upon a
20 drip tray 54 covered by a non-slip mat 56, though in an alternative embodiment an alternative non-slip surface is provided. The conduit in this embodiment is not long enough for the user 2 to dry his back without turning, but handle 52 is provided to allow the user to turn and stand whilst manipulating
25 with one hand the hot air outlet behind him.

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An alternative embodiment of wall mounted unit is shown in Fig.4 and Fig.5. This includes a housing 70 carrying a mirror 71, in this embodiment an adjustable angle vanity mirror, and a cabinet 72 for storage of various items, possibly including
5 optional drier heads each with a different hot air outlet configuration.

The hot air blower includes an air fan blade 73, and is energised by electric motor 74. Variable heating control 75 can be used to adjust the voltage across electric heating element 76,
10 and thus the energy dissipation in the heated wires which are downstream of fan blade 73. Thus air exits from the heating element 76 at a temperature dependent upon the temperature of the heated wires.

Variable air speed control 77 can be used to adjust the
15 rotational speed of fan blade 73, and thus the exit speed of the heated air to a comfortable value for the user and as required for his degree of wetness; it will be understood that a faster air speed will result in a lower air temperature unless the controls are interconnected.

20 The hot air outlet 14 in this embodiment has a replaceable clip-on head 78; it can also have a known alternative releasable connection, in one embodiment a bayonet type connection, and in another embodiment a friction grip.

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The drying head or hot air outlet 14 in its normal position as shown in Fig.4 engages positional clips 79, so that withdrawal of the drying head i.e. hot air outlet 14, automatically effects energisation of electric motor 75. Air intake is through inlet
5 22.

Fig.6 shows an alternative embodiment in use. The hot air body drier 10 in this embodiment is also wall mounted, but so is the hot air outlet 14. Thus the hot air outlet comprises a rigid conduit or tube 80 with orifices 81 along its length from which
10 hot air ejects in separate streams, in this embodiment to blow across the lower part of the body. In alternative embodiments the streams can be fan shaped so that they overlap at the body area, to avoid the user 2 having to bend and flex his legs for full hot air body engagement, whilst in a further embodiment the
15 hot air outlet has a continuous vertical slot so that the hot air emerges as an (unbroken) vertical wall. For more localised and concentrated drying, this unit may also feature a hand-held hot air outlet similar to that shown in Fig.3, this outlet being normally "closed off" so that hot air is not dissipated and so
20 that the pressure in tube 80 is not reduced.

A further feature of this embodiment is that it includes a head cowl 82 under which the user 2 stands, and from which air can also be drawn by way of connection 83 to the inlet 22a of the housing 12. Head cowl 82 can collect pre-heated air which has

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exited from conduit 80 and orifices 81 towards user 2. In this embodiment, cool (unheated) air can also be drawn directly into the hot air body drier at position 84, and can also be drawn into the conduit 80 at venturi points 85,86, perhaps to reduce the temperature of the heated air flowing from the heating means in housing 12 to an acceptable body temperature.

The embodiment of Figs.7 and 8 can be mounted alternatively to a wall or ceiling. It also has an overhead air intake 90, with the flow of heated air being generally downwards as viewed in Fig.8 to flexible conduit 16, through which it flows to hot air outlet 14. Thus the extraction fan 96 can be used either to draw in cool air, or to recycle used warm air. In this embodiment, the floor unit 54 has a rotating base 94, and can be used for water drainage to a sump 95 or fixed drain. The handrail 52 has lefthand and righthand components, either of which can alternatively be used as a towel rail if desired.

The embodiment of Fig.9 is of a free standing hot air body drier. The hot air outlet 14 has a first part 114a and a second part 114b. First part 114a is fixed to a floor unit 54 and has apertures 102 connected to a fixed conduit 80 leading from the hot air blower, which in this embodiment is mounted in head 104 of upper part 114b, but in an alternative embodiment is mounted in support 105. In an alternative embodiment apertures 102 can be controlled between a fully-opened and fully-closed position. Upper part 114b also has fixed-position orifices 81, as shown in

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the form of vertically extending slots; the vertical position of these slots relative to base 54 can be varied, universally or in discrete steps, by adjustment of upper part 114b using handrails 152 to allow the emitting air to flow over all of the user's 5 body. In this embodiment upper part 114b is of a lightweight material such as aluminium.

The embodiment of Figs. 10 and 11 is of a cabinet mounted arrangement. Cool air is drawn in through vent 115 and passes along conduit 116 to fan 114, whilst warmed air from inside the 10 cabinet is drawn in for recycling by way of entrance 117 to conduit 116. Entrance 117 is protected by mushroom head 111, to prevent condensate falling upon a cabinet user.

In this embodiment, the hot air outlet 14 emits or ejects hot air is solely at floor level, in this embodiment through some or 15 all of the openings in floor unit 54 used also for water drainage. The pre-heated air is conducted thereto by two air fans 74, each with a heating element 73. In an alternative embodiment air can also laterally project from apertures in the conduit 180, as indicated for the embodiment of Fig.6.

In an alternative embodiment the hot air outlet can be an 20 annulus, with apertures inwardly directed towards the annulus axis. Preferably the annulus or hoop can be raised and lowered, to fit around the user's body, and will conveniently be of diameter 1 metre. The annulus will normally be stowed adjacent

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the roof of a cubicle, or be ceiling mounted, and will then lower and raise upon the user stepping into position, either automatically or upon operation of a switch.

An advantage of a hot air body drier according to my invention
5 is that it can be actuated before the user enters the bath or shower, so that the bathing area or cubicle can be warmed ready for bathing or showering, or for when the user has completed the bath or shower. Thus not only can the user be dried by the hot air directed at the body, but the user is in an already-heated
10 room or cubicle, which can both increase personal comfort and assist body drying.

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CLAIMS

1. A hot air body drier which includes an air inlet (22), a hot air blower (73), air heating means (76) and a hot air outlet (14), characterised in that the hot air blower is connected to the hot air outlet by a hollow conduit (16,80) having a length greater than its width.
2. A hot air body drier according to claim 1 in which at least part of the hollow conduit (16) is flexible.
3. A hot air body drier according to claim 1 or claim 2 in which the hollow conduit is circular in cross section.
4. A hot air body drier according to any of claims 1-3 in which the hollow conduit has rigid ends (18,19) and an intermediate flexible section (17) therebetween.
5. A hot air body drier according to any of claims 1-4 in which the hot air outlet is shaped to channel hot air received from the hollow conduit into a fan configuration.
6. A hot air body drier according to any of claims 1-4 in which the hot air outlet has separated discharge openings to channel hot air received from the hollow conduit into separate air streams.

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7. A hot air body drier according to any of claims 1-4 in which the separate discharge openings (81) are vertically spaced.
8. A hot air body drier according to claim 6 in which the separated openings are horizontally spaced about an annulus and are directed radially inwards towards the annulus axis, the annulus having a diameter greater than 1 metre.
9. A hot air body drier according to any preceding claim in which, the air inlet is positioned to receive hot air discharged from the hot air outlet.
10. A hot air body drier according to any preceding in which the hot air blower and hot air outlet are located in a cubicle.
11. A hot air body drier according to claim 10 in which the cubicle has a wall, openable doors and a roof, the hot air blower being secured to the roof, the hot air outlet being secured to the wall.
12. A hot air body drier according to any preceding claim in which the hot air blower has a variable control for alternative heating means settings.
13. A hot air body drier according to any preceding claim in

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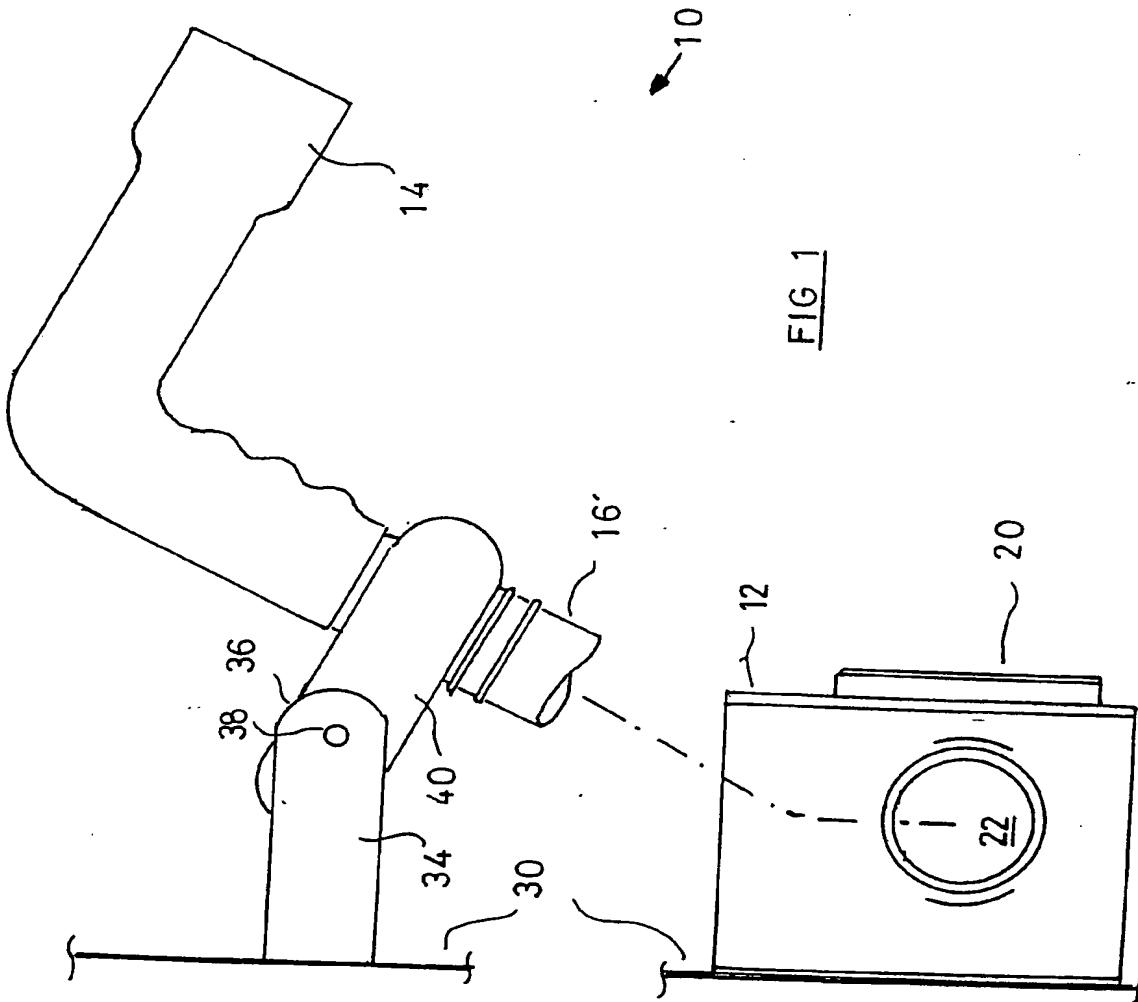
which the hot air blower has alternative air flow speed settings.

14. A hot air body drier according to any of claims 11-13 when dependent upon claim 10 in which the hot air outlet is an annulus which can move downwardly from a position adjacent the roof upon closure of the doors.
15. A hot air body drier constructed and arranged substantially as described with reference to Fig.1 and Fig.2, or Fig.3, or Fig.4 and Fig.5, or Fig.6, or Fig.7 and Fig.8, or Fig.9, or Fig.10 and Fig.11, of the accompanying drawings.

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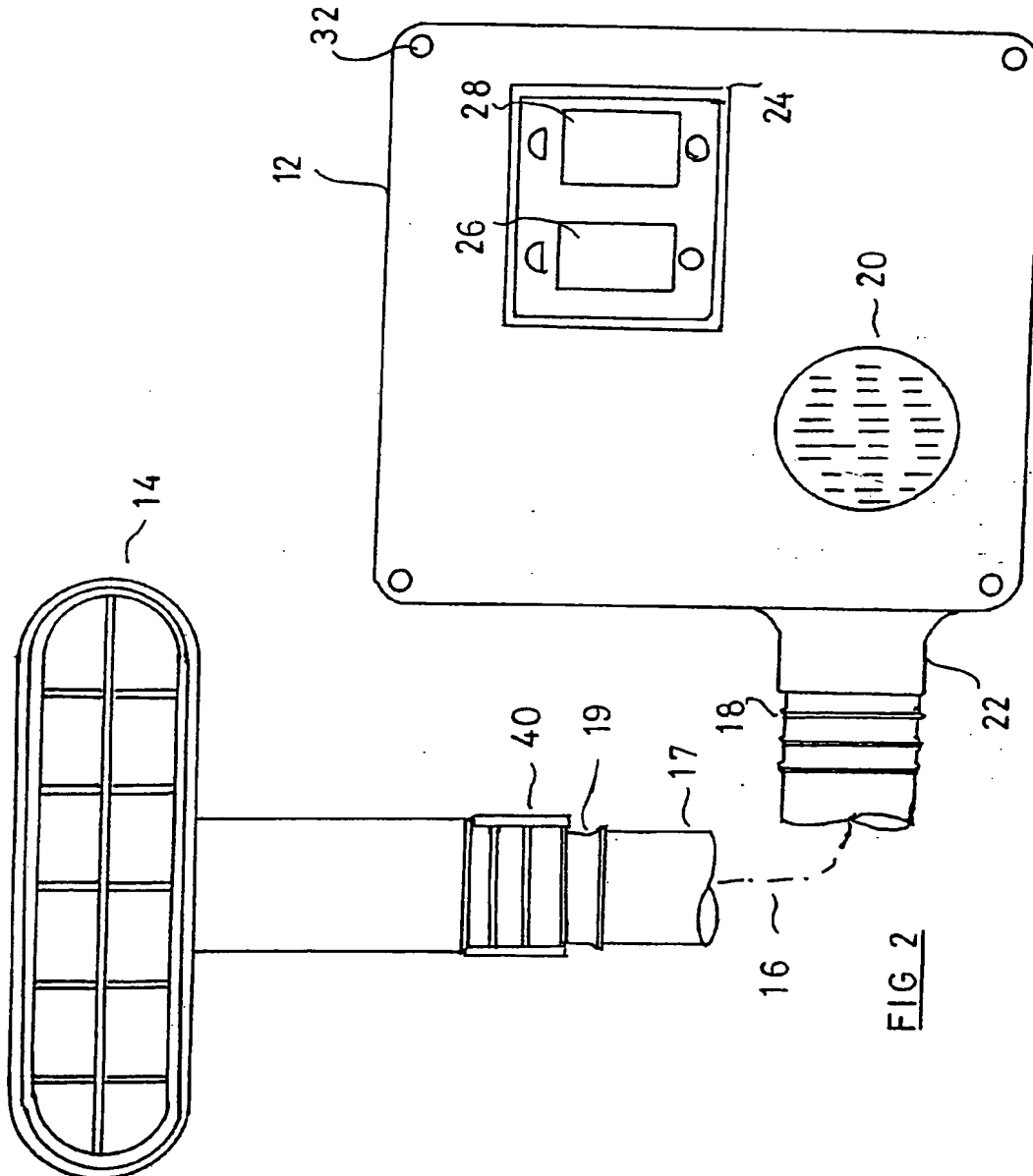
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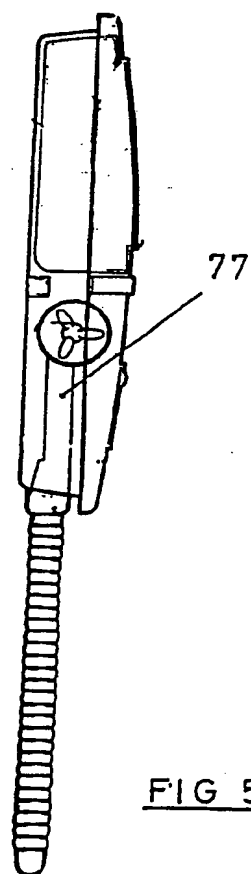
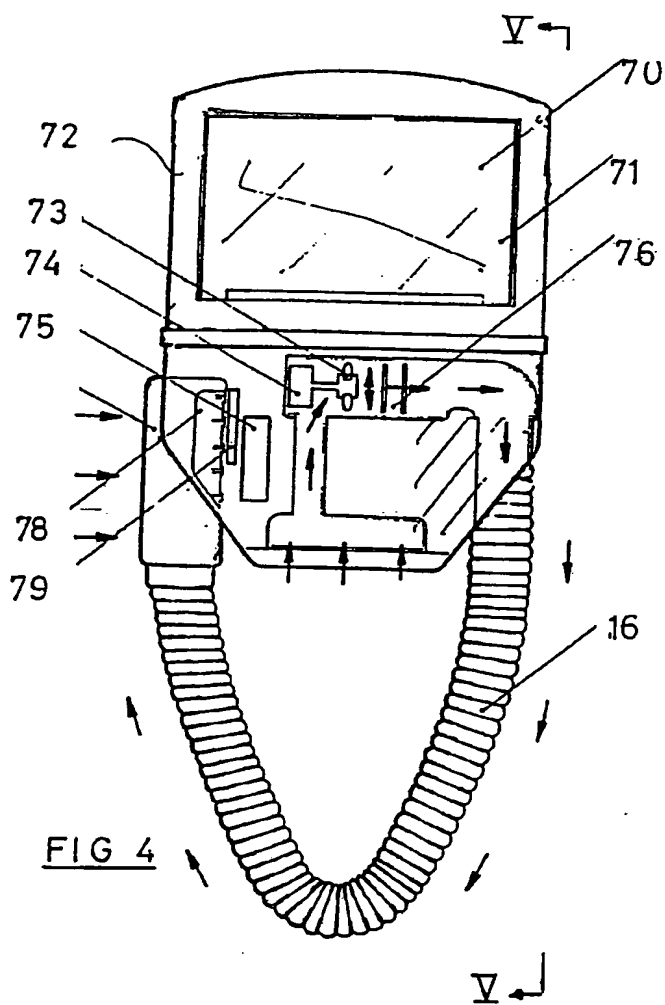
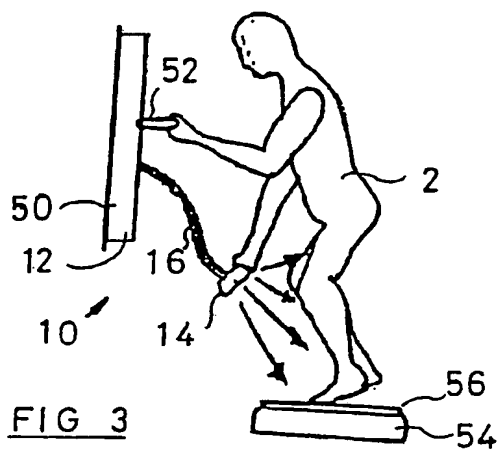
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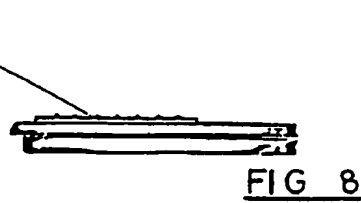
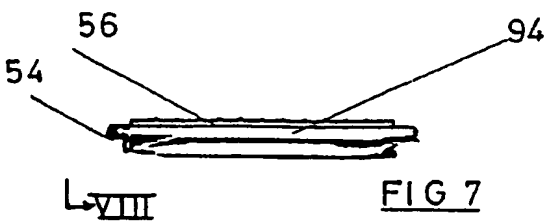
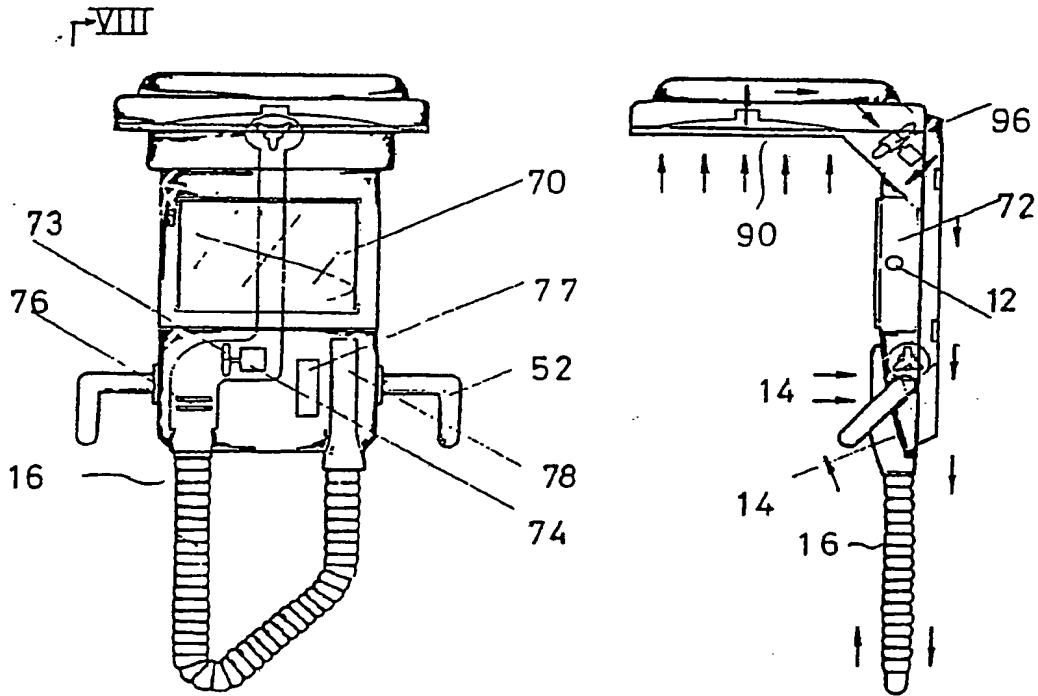
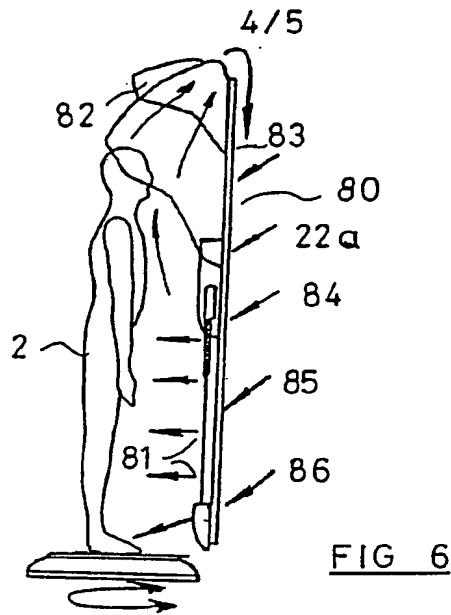
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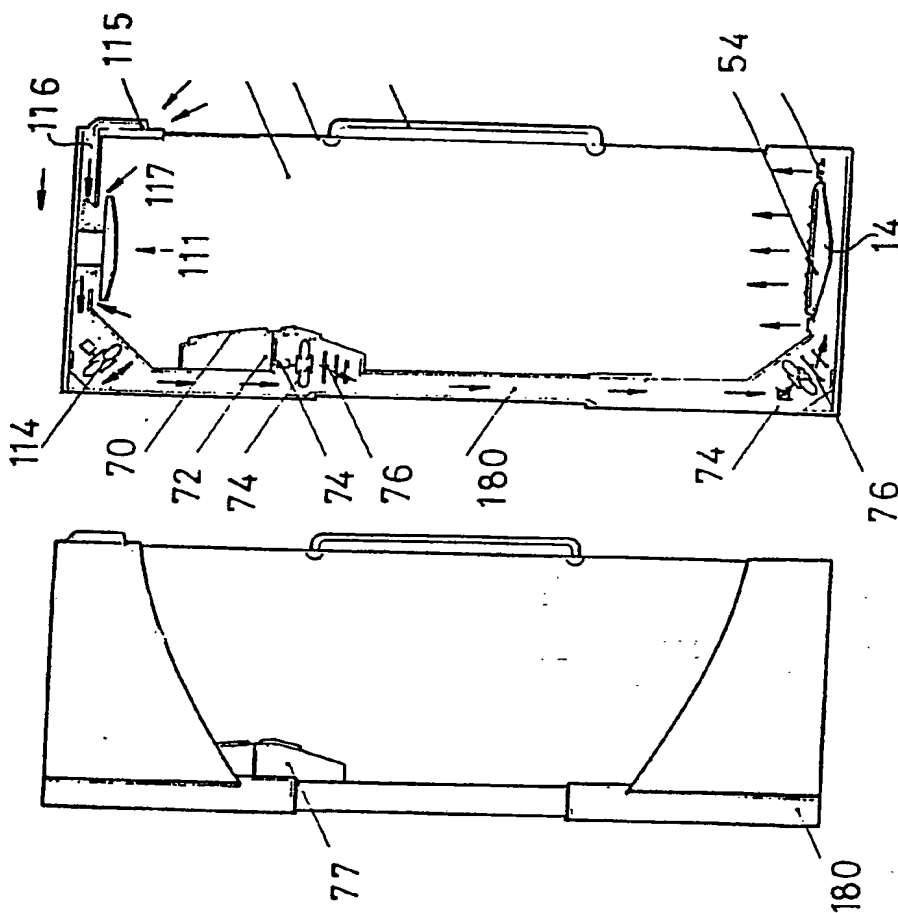


FIG 11

FIG 10

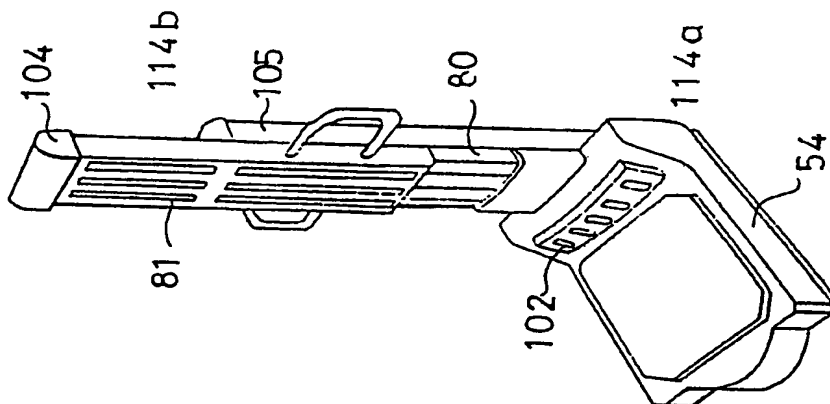



FIG 9

INTERNATIONAL SEARCH REPORT

PCT/GB 90/01877

International Application No

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all) ⁶		
According to International Patent Classification (IPC) or to both National Classification and IPC		
Int.Cl. 5 A47K10/48 ; A45D20/16		
II. FIELDS SEARCHED		
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Classification System	Classification Symbols	
Int.Cl. 5	A47K ; A45D	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁸		
III. DOCUMENTS CONSIDERED TO BE RELEVANT⁹		
Category *	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
X	US,A,3418452 (GRABNER) 24 December 1968 see the whole document ---	1-5, 12, 13, 15
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ANNEX TO THE INTERNATIONAL SEARCH REPORT ON INTERNATIONAL PATENT APPLICATION NO.

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